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ABSTRACT

This practicum report describes the development of a program designed to improve self-confidence in low-achieving seventh grade girls towards computers. The questionnaire "My Feelings Towards Computers" was used for pre- and post-comparisons. Students were introduced to the computer program LOGO, were taught to compose programs using the Logo computer language, and were exposed to a computer atmosphere that stressed critical thinking and creativity. The results, as indicated by pre- and post-testing, showed that seventh grade low-achieving girls can increase their self-confidence in computers by using LOGO. Increased self-confidence was noted in the following areas: liking computers, the field of computers as an occupation, the perception that girls are capable with regard to computers, the ability to understand computers, and being smart enough to use computers. It was concluded that Logo is an effective tool in increasing the self-concept towards computers of low-achieving seventh grade girls. Appendices include the questionnaire and a critical thinking checklist, the survey results, progress evaluation, and examples of student work. (13 references) (Author/DB)

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A PROGRAM TO DEVELOP THROUGH LOGO THE COMPUTER SELF-CONFIDENCE OF SEVENTH GRADE LOW-ACHIEVING GIRLS

by

MARION D. ANGELL

A Practicum Report

submitted to the Faculty of the Center for the Advancement of Education of Nova University in partial fulfillment of the requirements for the degree of Masters of Science

The abstract of this report may be placed in a National Database System for reference.

June/1991

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Marion Angell

Marion D. Angell

ABSTRACT

A Program To Develop Through Logo The Computer Self-Confidence Of Seventh Grade Low-Achieving Girls.
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Descriptors: Computers/ Logo/ Self-Confidence/ Secondary Education/ Low Achievement/ Sex Roles/ Gender Gap/ Self-Esteem/

Lack of self-confidence towards computers which affects low-achieving seventh grade girls was addressed by a program designed to improve self-confidence towards computers through Logo. One evaluation device, the questionaire "My Feelings Towards Computers", was used for pre- and post-comparisons. Students were introduced to the computer program Logo, were taught to compose programs using computer language, and were exposed to a computer atmosphere that stressed critical thinking and creativity. The results, as indicated by pre- and post-testing, showed that seventh grade low-achieving girls can increase their self-confidence in computers by using Logo. Increased self-confidence in the following areas was noted: liking computers, the field of computers as an occupation, the perception that girls are capable with regard to computers, the ability to understand computers, and being smart enough to use computers. It was concluded that Logo is an effective tool in increasing the self-concept towards computers of low-achieving seventh grade girls. Appendices include surveys, survey results, progress evaluation, and examples of student work.

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CHAPTER I

Purpose

The setting for this project is the nation's thirteenth largest school district, located in the southwestern part of the United States. This district consists of 96 elementary schools, 22 junior high schools, 21 senior high schools, and eight sixth grade centers. At present it serves more than 122,000 students and is projecting an enrollment of 160,000 by the year 2000.

The junior high school in which this study was conducted is located in a middle class area. Although the local economy is based on adult tourism the area depends significantly on manufacturing, both industrial and high-tech. The driving force behind the continued success of local industry is the computer. According to Goldstein, (1986:4)

> Few new technologies have grown as rapidly as the computer or penetrated so many industries in so short a time. In the 1940s there were only a few large computer government agencies and universities. By the mid-1980s there were more than 7

> million of them, used in every type of business and found in offices, factories stores, supermarkets, banks, hospitals, and satellites rocketing into space.

The target school has an average daily attendance of 1,211 students. Of the 1,211 students, 386 are sixth graders, 363 are seventh graders, 385 are eighth graders, and 77 are enrolled in special education programs. The ethnic distribution of the school's population is 90 percent Caucasian, 1.8 percent Black, 4.8 percent Hispanic, 2.0 percent Asian or Pacific Islander, 0.9 percent American Indian, and 0.5 percent other.

There are 46 teachers, nine teacher aides, five secretaries, two counselors, one dean, one principal, and one vice-principal. In addition, a psychologist, a nurse, and a speech therapist are available to the school on a part-time basis. The student-teacher ratio is 26:1. The author has taught at the target school for five years and is presently teaching seventh grade Life Science. Other subjects taught by

the writer include: eighth grade Physical Science, sixth grade General Science, and seventh grade Social Studies. Sponsoring and organizing social and academic activities also provides opportunities to interact with students in a non-academic capacity.

Students at the target school enjoy a variety of computer use and receive extensive computer application opportunities. The school contains five computer laboratories; one Apple GS lab, one MacIntosh lab, two Commodore labs, and one WASATCH Education Systems networking lab. The author serves as coordinator for the WASATCH lab consisting of a file server, printer, and sixteen computers. Because most of the students have had the writer as science teacher for two years, they are familiar with the basic procedures of the WASATCH lab.

Problem Statement

Although elementary and junior high school girls as a whole have increased their confidence

in and knowledge of computers in recent years, low-achieving girls may not be experiencing the same improvements as high-achieving girls. Not only do low-achieving girls experience the same computer gender gap as high-achieving girls, they may also feel added frustration brought about because of low self-esteem and lack of remedial assistance.

Therefore, their chances of being successful in an ever increasing computer dominated work force are significantly reduced. By understanding the seriousness of the unique position relating to low-achieving junior high school girls using computers it may be possible to find a solution that will enhance their abilities and increase their chances for success.

Extensive research has been initiated indicating a large gender gap in computer usage by junior high students in schools today. There is concern that if girls avoid the computer, they will miss out on an important educational advantage while they are in school. Because of

a lack of training, women may limit their ability to succeed in a society dominated by computers.

The author administered a survey to the target group titled "My Feelings About Computers" (Appendix A). The items on the questionnaire focused on three factors: liking computers, computer confidence, and male domination. Items relating to liking computers reflected their liking for learning about and with computers. Computer confidence items reflected the subjects' self-confidence toward using and learning computers. Male dominance items were designed to reflect an attitude that boys are more capable and better suited to using and working with computers than girls.

Results of the survey provide some evidence of differences between high- and low-achieving girls in their attitudes toward computers (Appendix B). Low-achieving girls felt that boys are better at writing stories on computers than girls while high-achieving girls did not.

Low-achieving girls were also more likely to be the ones to use a computer in the classroom. According to these statistics, high-achieving girls feel more strongly that computers are not necessarily for boys. The computer liking factor results indicated that high-achieving girls like computers more than low-achieving girls. High-achieving girls felt strongly that knowledge about computers will help them be more successful in life.

Statistics indicate that girls are less likely to pursue a career in computers than boys are. The results of the survey suggest that low-achieving girls are even less likely to pursue a career in computers than high-achieving girls.

The purpose of this study was to improve the attitudes of seventh grade female students towards computers. Although previous work has shown sex differences in computer attitudes, little has been done to investigate the differences in computer attitudes between high- and low-achieving girls. The writer has

designed a program to supplement the computer capabilities of low-achieving girls in order to enhance their chances for success.

Outcome Objectives

The writer instructs seventh grade students and has noted a lack of self-confidence by low-achieving girls towards using computers. The author's school has no program for enhancing low-achieving students' confidence and perception toward computers. Negative perception of computers is a problem for the target group, the low-achieving seventh grade girls enrolled in the author's Life Science classes. At the conclusion of this practicum the following objectives were to have been attained:

1. After two weeks of instruction using the basics of Logo, ninety-five percent of the target group participating in the computer self-confidence improvement study will be able to learn seven basic commands of Logo. Improvement will be measured by the

administration and comparison of a post test (Appendix C).

2. At the conclusion of week eight seventy-five percent of the target group participating in the computer self-confidence improvement study will be able to compose a computer printout of a house on the WASATCH Education Systems network using basic Logo commands (Appendix D).

3. At the conclusion of week twelve, ninety-five percent of the target group participating in the computer self-confidence improvement study will be able to compose a computer printout of a unique creation on the WASATCH Education Systems network using basic Logo commands (Appendices E and F).

4. The target group participating in the computer self-confidence improvement study has been surveyed using a questionnaire titled "My Feelings About Computers" (Appendix A). Thirty-five percent of the students were shown to lack self-confidence regarding the use of computers (question 20 of the survey). After

a twelve week period of instruction and practice in the use of problem solving through Logo, ninety percent or more of the target students will have improved self-confidence regarding the use of computers as measured by the readministration of the questionnaire "My Feelings About Computers".

CHAPTER II

Research and Solution Strategy

Computers are no longer considered to be high-tech devices used exclusively by government agencies and university professors. Computers have become instrumental to the advancement of technology through their successful application in virtually every industry. But it cannot be assumed that the workplace will wait for students to graduate from high school with inadequate computer literacy, and then train them for high-tech careers on the job. Yet, although computer and other technological advances have led to a demand for a whole range of programming and software occupations, not all members of society are benefiting equally (Cusick, Theresa, et al, 1986). Despite the fact that women make up forty-five percent of the work force, according to Cusick, Theresa, et al, many women continue to function at the lowest end of their career ladders, and are the "technopeasants" of the high-tech work force.

There is concern that if girls continue to avoid the computer, they will miss out on an important educational advantage while they are in school. And by receiving inadequate training, women may seriously limit their options in a society dominated by computers (Collis, 1985b). Campbell and Perry state that

> .....computer skills are becoming a requirement for entry and success in many occupational fields, and it appears computer usage has joined mathematics as a new "filter" limiting educational and career choices of secondary school students (Campbell and Perry, 1988:3).

Young girls enjoy using computers. Research has shown that at age four and five, computer users are equally likely to be a boy or a girl (Johnson, 1985). Female perception of computers continues to equal the high confidence of computer use by males through the fifth grade (Enochs, 1984). However, when students reach middle school girls tend to become less interested in computers than boys. According to Sanders, studies of optional computer use in middle schools showed that seventy-eight percent of the students who took advantage of free time computer use were boys (Sanders,

1985). He explains that with the onset of adolesence females begin to recognize that certain behaviors, attitudes, and skills are deemed to be more appropriate for one sex than another. Therefore, computer avoidance by girls is an expression of "sex-appropriateness" directly related to peer pressure and serves to enforce sex-roles.

A survey conducted in Peoria, Illinois indicated that the percentage of female students who used computers decreased substantially from grade schools to senior high schools (Demetrulias, 1985). Enrollment in computer camps and summer classes offering computer courses is dominated by boys at all levels. One study found that in the camps the proportion of females compared to males was thirty percent in the primary grades, twenty-six percent in the middle school grades, and twenty-four percent in high school (Hess and Miura, 1985). Having a computer at home is a tremendous advantage in becoming computer literate. A survey of middle school students administered by Sanders found

that thirty-seven percent of the males had a computer at home, while only twenty-eight percent of the females had one (Sanders, 1985).

The overall picture in senior high school seems to be a continuation of gender gap trends observed in middle school students. In a study of computer literacy in high school students, gender was significantly related to achievement gain in computer literacy. According to Urban,

> Females gained less than expected and males gained more than expected. Access to and experience with computers were generally unrelated to gain with two exceptions: 1) asking the teacher for help was a determinant of gain for female students and 2) access to computers outside of school was a determinant of gain for ninth and tenth grade students (Urban, 1986:51).

It is difficult to pinpoint the exact reasons for computer inequality, but educators are the ones most likely to affect change. Sanders offers some ideas that point to a realistic understanding of the helps and hindrances to achieving computer equity in the schools. He says that most teachers do not use computers in their classes or are non-computer literate. These teachers are the most likely

ones to say that if girls do not use computers it is because they're not interested. Sanders continues:

> The key to computer equity success in a school seems to be the willingness of the faculty to take active steps toward encouraging girls' computer use. They need to feel that computer use is valuable in and of itself, and to feel that a focus on girls is important and legitimate. With these attitudes, they can take such steps as:
> - Offering computer activities that girls enjoy, such as word processing, Logo, graphics, and others, in class and after school.
> - Encouraging social interaction among girls in the computer lab.
> - Encouraging parents to influence their daughters' computer use.
> - Arranging for formal or informal in-service training to acquire computer skills and/or extend their awareness of sex equity issues (Sanders, 1985:4).

In recognizing the gender gap as it pertains to computers, the unique position of low-achieving girls must also be considered. Their chances of being successful in an ever increasing computer dominated work force are significantly reduced. Lack of self-esteem hinders confidence in computers for low-achievers, and is reinforced by their

perceived inadequacy due to the sterotypical image that computers are for "bright" boys. Yet girls can achieve success if they feel that they can succeed. Campbell, Perry, et al, state:

> A student's perception of his/her own competency in an area is related to the willingness with which the student will attempt to complete tasks in that area. Students typically choose school tasks that they are more confident with and will result in successful achievement..... (Campbell, Perry, et al, 1988:2).

It has been shown that female low-achievers may require substantially more time to reach the same level of computer performance than their high-achieving peers (Gattiker, 1989). However, Gattiker found that additional practice time can help reduce the performance gap.

"Self-efficacy is the belief that one can execute successfully a certain course of behavior" (Miura, 1986). Miura states:

> .....perceptions of self-efficacy regarding a task can influence the choice to engage in that task, the effort that will be expended in performing it, and the persistance that will be shown in accomplishing it (Miura, 1986:2).

Low-achieving girls, therefore, will put more effort into a computer task if they feel that

they can succeed.

Logo is a computer program designed to teach the user both programming language and critical thinking skills. This program is ideal for low-achieving girls in that it offers the users a method by which they can overcome the barriers that impede their chances for success. By learning to program computers at a young age, low-achieving girls will be less intimidated by the more difficult computer classes offered in high school and college. Cusick, Theresa, et al state that "Schools that avoid teaching students to program are hiding from kids what computers really are and can do" and thus are limiting their future intellectual and employment options (Cusick, Theresa, et al, 1986).

It has also been shown that girls are better suited to computer programs such as Logo. Although BASIC is the most common computer language taught in schools, most girls find Logo more interesting (Sanders, 1985). Sanders has said that:

> Girls seem to prefer purposeful activities, and many computer activities involve pointless game playing and random exploration of the computer's capabilities.

Furthermore, Logo allows the user to learn to create, manipulate, and apply what has been learned, thus gaining a greater mastery of the world. The resulting sense of power and self-confidence achieved by the user will induce a "realistic image of himself as an intellectual agent" (Papert, 1980).

An effective method of increasing a low-achieving girl's self-confidence is to offer her a chance to be successful at a problem solving technique using computers that she perceived to be unobtainable. By the very nature of its design, Logo is such a method. If low-achievers realize that they are just as capable as their peers with regard to computers they will be more likely to become involved with computers later in life. Thus, their opportunities for success in the field of computers will greatly increase.

CHAPTER III

Methodology

The following implementation method was used to develop through Logo the computer self-confidence of low-achieving girls.

Weeks One and Two

The WASATCH Educational Systems computer program Logo was introduced to the seventh grade students and it was be explained that the program is designed to improve problem solving skills. Students were given several key Logo commands to be kept in their student notebooks for easy access and reference. Student tables were arranged around the room in order to create a central open area. Student volunteers were chosen to participate in a role playing game designed to teach the basic Logo commands. The volunteers were blindfolded and placed in the center of the room. Other students then took turns giving Logo commands to the blindfolded student who attempted to comply.

Students were then placed into groups of

four. In each group, members tutored and quizzed each other on the Logo commands assigned to them. Finally, students were required to take a quiz to determine the basic Logo commands that they had learned.

Week Three

Students were assigned a computer in the WASATCH lab one day each week. Two students worked at each computer station, and in each case one high-achieving student was teamed with one low-achieving student. Preliminary start-up instruction were not required since the students had been using the WASATCH computers on a regular basis for the past two years. An adult aide was present to assist in the event of technical problems.

Initially, student teams were allowed to experiment using the Logo commands they had learned. Gradually, new Logo commands were introduced by requiring students to attempt to identify the correct command. For example, students were asked to figure out the command for erasing mistakes. After a brief period, if none

of the students could obtain the correct command, the command was given to them. Students then wrote the new command into their notebooks.

Weeks Four and Five

Using the same methods for teaching Logo commands as was used during week three, students were taught several new Logo commands. Some of the commands were: set pen color (setpc #), set background (setbg #), clear screen (cs), clean graphics (cg), pen erase (pe), REPEAT, SAVE, get file (file), and see text (F3).

During weeks four and five, students took turns writing their names using Logo commands (Appendix G). Team members were encouraged to assist their partners if needed. Students were encouraged to be creative if possible. Time was given during each meeting for students to create new designs and patterns using Logo commands. Students were free to borrow creations from other classmates. Student results were printed out and displayed in the classroom.

Week Six

Students were instructed to draw squares. Then they were shown how to write commands using "To" as a precursor and "End" to complete the command formation. Students were expected to use the "see text" command to help them find out what they had done to make a square. An example of how to make a square command was:

```
to SQUARE
REPEAT 4{fd 50 rt 90}
end
```

When completed, students needed only to type "square" and a square would appear on the screen.

Weeks Seven and Eight

Students were directed to design commands for squares, triangles, circles, and any other design they desired. After a time, they were instructed to create a superprocedure which would make a crude house using squares and triangles (Appendix D). An example of the superprocedure was:

```
to SQUARE
st
REPEAT 4 {fd 50 rt 90}
end
```

```
to TRIANGLE
rt 90
fd 50
rt 30
REPEAT 3[fd 50 rt 120]
ht
end

to HOUSE
SQUARE
TRIANGLE
end
```

Student results were printed out and evaluated objectively by the teacher.

Weeks Nine and Ten

Using Logo, students drew a picture of their choice using commands they had created (Appendices H and I). Student drawings were displayed in the classroom.

Weeks Eleven and Twelve

Students were taught the "Random" command. They were then directed to create a design or picture using the theme title of "Wild". Student teams collaborated on the final Logo

project and were encouraged to design creative and unique designs. They were also encouraged to borrow ideas from other classmates. Results were printed out and displayed in the classroom. The teacher evaluated each creation subjectively keeping in mind the objectives of the Critical Thinking and Self-Reflection Checklist (Appendix J). The questionnaire "My Feelings About Computers" was given as a post test at the conclusion of week twelve.

CHAPTER IV

Results

Objective One

At the beginning of week one none of the target students had ever used Logo. At the end of week two the Logo Primatives Quiz (Appendix C) was administered. All but one (95 percent) of the target students passed the quiz with 100 percent accuracy. One student missed one question on the quiz. These results indicate that the target students had no difficulty grasping the Logo commands.

Objective Two

At the conclusion of week six 100 percent of the target students were able to compose a computer printout of a house on the WASATCH Educational Systems network using basic Logo commands. Some of the target students were able to achieve this with little or no assistance. Most, however, required the assistance of either their team partner or the teacher. Although all

target students turned in an accurate composition of a crude house, those students would benefit from additional practice.

Objective Three

At the conclusion of week twelve, 100 percent of the target students were able to compose a computer printout of a unique creation on the WASATCH computer using advanced commands. Even though all students were able to fulfill the requirements for the unique creation, some target student designs were superior to others.

Objective Four

Pretesting, using the questionnaire "My Feelings About Computers", indicated that 35 percent of the target group felt they were not smart enough to be good at computers. The author intended to increase the self-confidence of the target group with regards to using computers from 56 percent to 90 percent. Further, the author intended to improve the target group's perception of computers as a whole.

Post testing revealed that the objective of

increasing the self-confidence of low-achieving seventh grade girls towards computers to 90 percent was not met (Appendix K). Results from post testing using the questionnaire "My Feelings About Computers" indicated that 70 percent of the target group felt that they were smart enough to be good at computers, as opposed to 56 percent on the pretest. Post-questionnaire results indicated that 90 percent of the target students liked to use computers, as opposed to 76 percent on the pretest. Results of the pretest questionnaire show that 76 percent of the target students felt they could perform as well on computers as boys, as opposed to 96 percent on the post test.

These survey results suggest that seventh grade low-achieving girls can improve their self-confidence towards computers by using Logo, a computer program that requires extensive critical thinking capabilities. In fact, every target student except one improved her self-confidence towards computers to some degree (Appendix L).

CHAPTER V

Recommendations

Although all stated objectives were not achieved, increased confidence towards computers by seventh grade low-achieving girls through the use of Logo demonstrated merit and warrants further study.

Results of the pre- and post- questionnaire "My Feelings About Computers" show improvement in six of the seven questions pertaining to computer self-confidence. Of the six questions where computer self-confidence improved, the increase averaged 13.5 percent. Of the fifteen students participating in the survey, fourteen demonstrated improvement in their responses to at least one computer self-confidence question. Of the seven questions pertaining to computer self-confidence, the target group changed (improved) their responses by an average of 2.4 questions from the pretest to the post test.

The one question where the target group decreased in self-confidence regarded whether or

not they would be better people if they better understood computers. Students seem to have misunderstood this question. It is possible that they felt the question offended them and responded negatively. Nevertheless, the question was poorly written and should not have been part of the survey.

It has been shown that seventh grade low-achieving girls can improve their self-confidence with regard to using computers. It has also been shown that Logo is a successful instrument in in developing self-confidence towards computers. Therefore, the author will recommend that a program involving Logo be implemented in the target school as an exploratory class for all students.

In addition, the author will recommend that the target school continue to foster the concept of increasing self-confidence towards computers by establishing an after-school program, involving Logo, for all students with an emphasis on female low-achiever participation.

Parents could be recruited to assist in the club and establishing community support would be essential. Corresponding with other Logo organizations (by MODEM) throughout the United States could be fun as well as educational. Logo competitions emphasizing critical thinking and creativity could help to foster an interest in computers by low-achieving girls.

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Appendices

Appendix A

"My Feelings About Computers"

Questionnaire

My Feelings About Computers

SD - Strongly Disagree
D - Disagree
N/A - Don't Know/Does Not Apply
A - Agree
SA - Strongly Agree

1. In my family, boys are most likely to be the ones to use computers.	SA	A	N/A	D	SD
2. In this class, girls are most likely to be the ones to use a computer.	SA	A	N/A	D	SD
3. I like to use computers.	SA	A	N/A	D	SD
4. If I had spare time I would like to use it working on computers.	SA	A	N/A	D	SD
5. If I had a choice as to electives, I would like to take a computer class.	SA	A	N/A	D	SD
6. Knowing about computers can make people like me more.	SA	A	N/A	D	SD
7. Knowing about computers will help me be more successful in life.	SA	A	N/A	D	SD
8. Knowing about computers will help me get a better job.	SA	A	N/A	D	SD
9. I will be a better person if I learn more about computers.	SA	A	N/A	D	SD
10. Boys do better in computers than girls.	SA	A	N/A	D	SD

11. Girls are more likely to sign up for computer classes than boys.	SA	A	N/A	D	SD
12. Girls don't do as well at computers as boys do.	SA	A	N/A	D	SD
13. Girls are better at writing stories on computers than solving problems on computers.	SA	A	N/A	D	SD
14. Boys are better at writing stories on computers than solving problems on computers.	SA	A	N/A	D	SD
15. My friends would think I am wierd if I liked computers too much.	SA	A	N/A	D	SD
16. Girls are more likely to have a computer at home than boys.	SA	A	N/A	D	SD
17. Students who use computers a lot are nerds.	SA	A	N/A	D	SD
18. Girls probably should not use computers because computers are for boys.	SA	A	N/A	D	SD
19. I would like computers more if I understood them a little bit better.	SA	A	N/A	D	SD
20. I am not smart enough to really be good at computers	SA	A	N/A	D	SD

Appendix B

Pre-Questionnaire Results

Appendix B

Results of the Survey "My Feelings About Computers"

Question Number	Responses of high-achievers (%) SA/A	D/SD	Responses of low-achievers (%) SA/A	D/SD
1	7	90	28	63
2	56	28	49	49
* 3	90	7	76	14
4	14	42	56	28
5	14	70	21	63
6	14	76	7	83
* 7	96	0	70	7
* 8	84	7	70	14
* 9	14	83	21	56
10	0	83	0	83
11	28	42	56	14
* 12	14	90	14	76
13	35	21	35	49
14	0	56	7	56
15	35	56	35	49
16	14	56	21	49
17	14	90	7	83
18	0	96	7	83
* 19	49	42	56	21
* 20	0	96	35	56

* denotes questions pertaining to computer confidence

Appendix C

Logo Primatives Quiz

Appendix C

Name _____

Period _____

Date _____

Logo Primatives Quiz

Describe the function of each of the below turtle commands:

FD

BK

RT

LT

HT

ST

HOME

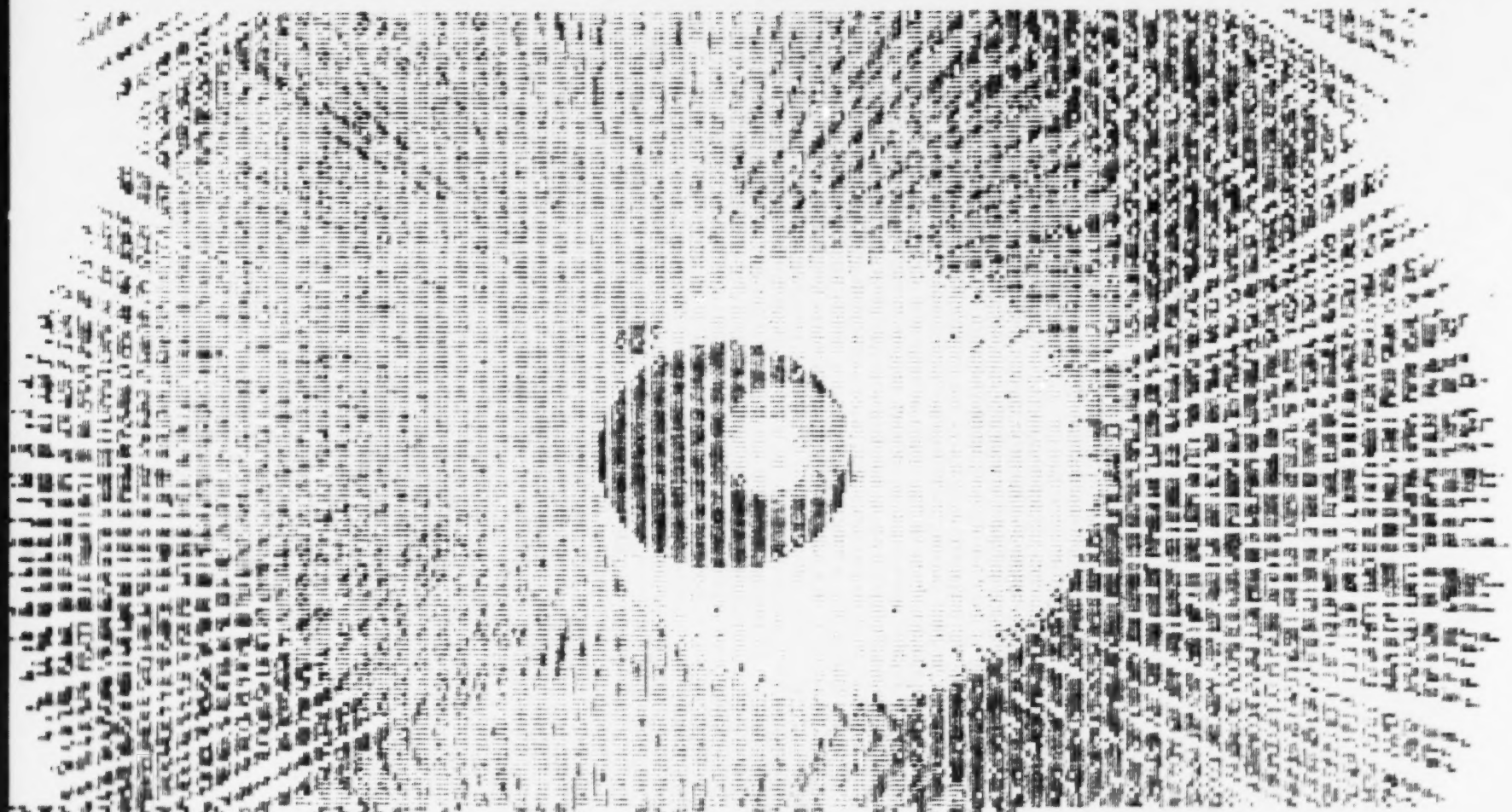
Appendix D

Example of a House

```
HOUSE is defined.
?HOUSE
?CS
?HOUSE
?-
```

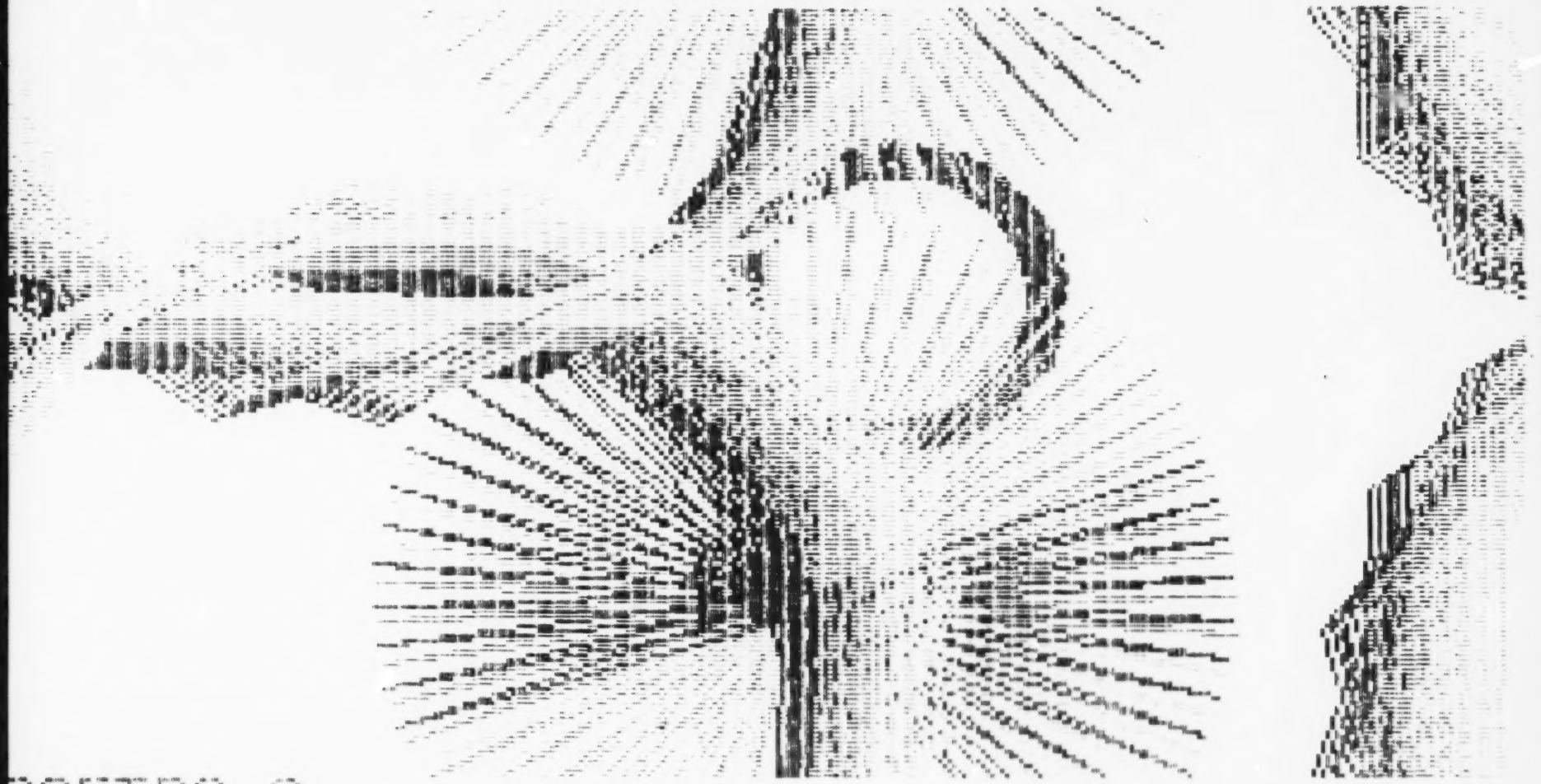
Appendix E

Example of Creative Work



Appendix F

Example of Creative Work



```
?SETPC 2
?REPEAT 100[FD 100 RT 54]
?SETPC 1
?REPEAT 100[FD 100 RT 54]
?
```

Appendix G

Example of Logo Name

```
Top level
?RT 180
?FD 15
?HT
?_
```

Appendix H

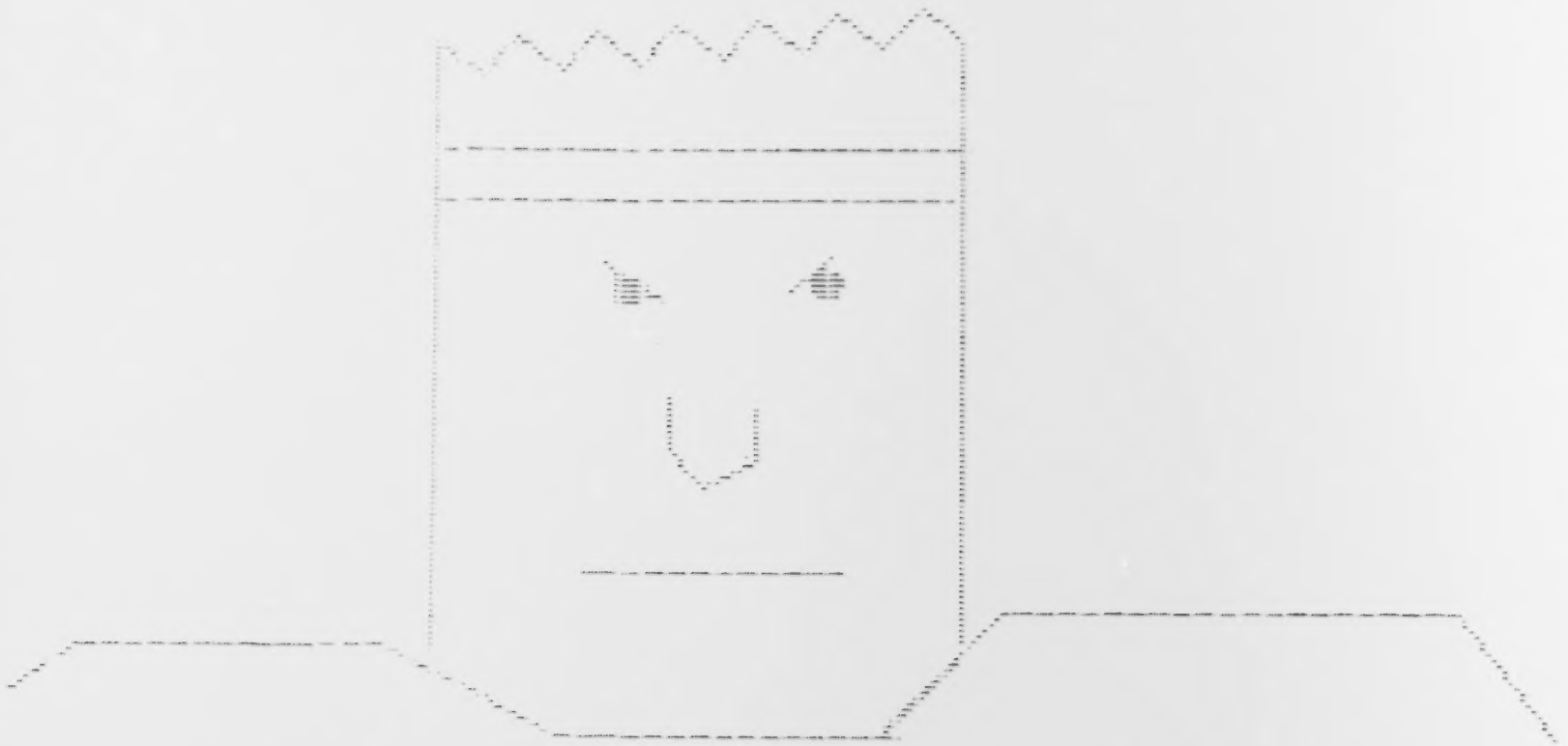
Example of Picture

BOOK
NO 1
0

AVE

Appendix I

Example of Picture



```
?HT
??ST
???FD  91
???HT
??ST_
```

Appendix J

Critical Thinking Checklist

Appendix J

Critical Thinking and Self-Reflection Checklist

The GEM Practicum Internship

John Barell - (Adapted)

Using a scale of 1 to 5, rate your work setting according to the following items:
5=Very Often 4=Often 3=Sometimes 2=Seldom 1=Rarely

CLASSROOM

1.	When students pose unusual or divergent questions, I ask, "What made you think of that?"	5	4	(3)	2	1
2.	Information in the text is challenged.	5	(4)	3	2	1
3.	When a decision has to be made between involving the class discussion of an intriguing student idea (topic related) or moving on to "cover" content, I choose the former.	(5)	4	3	2	1
4.	I encourage participants to seek alternative answers.	(5)	4	3	2	1
5.	The target group receives positive reinforcement for initiating questions.	(5)	4	3	2	1
6.	Problems are used as a means for the target group to generate their own questions (or problems), which we then seriously consider.	5	4	(3)	2	1
7.	Teaching and learning occur without teacher talk.	5	(4)	3	2	1
8.	Most questions posed during class can be answered with short or one-word answers.	5	4	3	(2)	1
9.	Students spontaneously engage in critiquing each other's thinking.	5	4	(3)	2	1
10.	Students are encouraged to relate subject matter to experiences in other subjects or to their personal lives.	5	(4)	3	2	1

11. I stress how to think, not what to think.	5	4	(3)	2	1
12. Students often set objectives for their own learning.	5	4	3	(2)	1
13. Students spend time working collaboratively to solve subject matter questions.	(5)	4	3	2	1
14. One focus in my implementation is trying to help others understand how and why people (mentioned in texts) created ideas, solutions, experiments, rules, principles, and so on.	5	4	3	(2)	1
15. Students actively listen to each other.	(5)	4	3	2	1
16. I facilitate collaborative instructional problem solving.	5	(4)	3	2	1

Appendix K

Pre- and Post-

Questionnaire Results

Appendix K

Comparrison of Low-Achiever's Results of the Pre- and Post- Questionnaire "My Feelings About Computers"

	Question Number	Pretest Responses of Low-Achievers (%) SA/A	Pretest Responses of Low-Achievers (%) D/SD	Post Test Responses of Low-Achievers (%) SA/A	Post Test Responses of Low-Achievers (%) D/SD
	1	28	63	14	63
	2	49	49	56	28
*	3	76	14	90	0
	4	56	28	49	21
	5	21	63	49	28
	6	7	83	7	76
*	7	70	7	83	14
*	8	70	14	76	14
*	9	21	56	14	28
	10	0	83	7	90
	11	56	14	35	70
*	12	14	76	7	96
	13	35	49	28	49
	14	7	56	14	63
	15	35	49	35	56
	16	21	49	28	63
	17	7	83	14	76
	18	7	83	0	90
*	19	56	21	76	7
*	20	35	56	28	70

* denotes questions pertaining to computer confidence

Appendix L

Pertinent Response Table

Appendix L

Number of Pertinent Question Responses Showing Student Improved Self-Confidence (7 total)

Student #	Number of Responses
1	3
2	5
3	2
4	3
5	3
6	2
7	3
8	1
9	3
10	5
11	1
12	2
13	1
14	2
15	0

2.4 average

Practicum Software Evaluation Form

AUTHOR: WASATCH Educational Systems Network

TITLE: Logo

Check all that apply

TYPE: ___Academic Game ___Drill and Practice
___Administrative ___Simulation
___Test/Diagnostic ___Tutorial
X Problem Solving ___Other

LEVEL: ___Preschool ___K-3 ___4-6 X 6-8 ___9-12 ___Adult

PURPOSE: ___Remediation X Developmental ___Enrichment

HARDWARE: Computer Tandy 1000 K Ram required 48 Color (Y) N
Number of Drives 2 Printer (Y) N Other _____

	Circle Rating		
CONTENT			
1. Program has educational value	(Y)	N	NA
2. Grammar accurate and free of syntax errors	(Y)	N	NA
3. Stereotype free of (race, ethnic, sex, etc.)	(Y)	N	NA
4. Content adaptable to varied instructional strategies	(Y)	N	NA
INSTRUCTIONAL QUALITY			
5. Purpose of the program well defined	Y	(N)	NA
6. Defined purpose is achieved	(Y)	N	NA
7. Presentation of content is clear and logical	Y	(N)	NA
8. Level of difficulty appropriate for target audience	(Y)	N	NA
9. Sequence organized for selected developmental steps	Y	N	NA
10. Graphics, color, sound appropriate for instruction	(Y)	N	NA
11. Student controls rate and sequence of presentation	(Y)	N	NA
12. Program is self-paced and controls the sequence	Y	(N)	NA
13. Entry level prerequisites specified	(Y)	N	NA
14. Program user friendly, easy-to-read, to understand	Y	(N)	NA
TECHNICAL QUALITY			
15. Instructional text formatted, sized for easy reading	(Y)	N	NA
16. Students can easily operate program independently	Y	(N)	NA
17. Relevant computer capabilities used	(Y)	N	NA
18. Program reliable and student proof	(Y)	N	NA
19. Adequate error trapping	(Y)	N	NA
20. Easy escape from program provided	(Y)	N	NA
21. Record keeping/printouts of student progress	(Y)	N	NA
DOCUMENTATION			
22. Manuals available and user friendly	Y	(N)	NA
23. Clear operating instructions and trouble shooting	Y	(N)	NA
24. Constant reference to documentation unnecessary	(Y)	N	NA
25. Table of Contents, Index, Glossary of Terms provided	(Y)	N	NA